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Measurement of Load Index and Labor Needs Using Full Time Equivalent Method in Department Remuneration and Industrial Relations PT. Pupuk Kujang Cikampek

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ABSTRAK

Kinerja Karyawan merupakan faktor yang berpengaruh terhadap keberhasilan perusahaan. Kinerja yang optimal dan sesuai SOP akan membuahkan hasil yang maksimal. PT.Pupuk Kujang Cikampek merupakan perusahaan yang bergerak di bidang transformasi pupuk organik dan organik skala nasional. Pada perusahaan ini terdapat kesenjangan antara beban kerja karyawan dengan jumlah karyawan yang ada. Metode ini bertujuan untuk menyederhanakan pengukuran kerja dengan mengubah beban kerja menjadi jumlah pekerja yang dibutuhkan. Metode *Full Time Equivalent* (FTE) merupakan metode analisis beban kerja dengan cara mengukur waktu penyelesaian pekerjaan dan mengubahnya menjadi nilai indeks FTE. Setelah dilakukan perhitungan dengan metode FTE diperoleh hasil bahwa beban kerja pada Departemen RHI bervariasi, beban kerja pada satuan kerja TKO sebesar 2,84, satuan kerja TKNO sebesar 3,18, satuan kerja programmer sebesar 1,06, satuan kerja asuransi pegawai sebesar 1, 95, satuan kerja kesejahteraan pegawai sebesar 2,18, satuan kerja pengembangan pegawai sebesar 2,18, satuan kerja administrasi sebesar 1,93, dan satuan kerja staf VP RHI sebesar 0,95. Berdasarkan indeks skor FTE, terdapat saran untuk menambah pegawai pada satuan kerja TKNO Payroll, Kesejahteraan Pegawai, dan Pengembangan Pegawai, dengan menambah 1 pekerja pada setiap satuan kerja.

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1. INTRODUCTION

In today's age of globalization, especially in the industrial sector, every company is expected to produce goods or services that can be used by consumers with comfort and safety. To achieve the best product, human labor is needed which is often referred to as labor through. Employee performance is one of the elements that affect the success or failure of an organization or company. With optimal work results and proper enforcement of procedures, positive results will also be achieved. Therefore, if the workload assigned to team members is too heavy, the impact can be detrimental to their performance. They may feel burdened and uncomfortable when carrying out their duties, as a result their performance can decrease, adversely affecting the company [1] [2].

PT Pupuk Kujang is a company in the fertilizer industry sector at the national level, which focuses on the process of transforming organic and inorganic matter into chemical products such as urea, ammonia, and NPK. The factory owned by PT Pupuk Kujang was built in the Dawuan Village area, Cikampek District, Karawang Regency, with a land area of 510 hectares. Within this company, there are two main factories, namely Kujang 1A and Kujang 1B. The fundamental difference between the two lies in the year of its establishment. Kujang 1A factory was established in 1975, while Kujang 1B was established in 2001. Both plants have the same production capacity, producing 570,000 tons of urea per year and 330,000 tons of ammonia per year.

As for some previous research on this research topic, among others:

1. According to research by Tigor Gabriel Pasaribu and Asep Erik Nugraha [3], workload analysis using the Nasa-TLX Method can affect employees' mental workload. Based on the mental workload score using this method, it was found that 14 employees had a very high mental work load, while 2 employees had a high mental work load. Thus, for improvement proposals that can be shared in order to reduce the score / rating of employee mental workload, namely by adding employees according to the needs of related team parts and also the company, training activities on anticipating mental workload and sharing session activities between fellow employees regarding hearings about complaints during work.

2. According to research by Anita Pramesti and Endang Suhendar [4], this study aims to determine the workload on hammer mill machine production operators for measuring and cutting materials, assembling, painting, and finishing good, to determine the factors causing mental workload with indications of employee turnover and to reduce the mental workload felt by hammer mill production operators. Proposed improvements were made by conducting psychological tests, providing training, providing Personal Protective Equipment (PPE) while working and changing work shifts

3.According to the research of Zaskia Azhar Yasmin and Silvi Ariyanti, with the workload analysis using the Full Time Equivalent (FTE) Method, it can find out the value of the workload that occurs in BD-Check maintenance work. This is due to the lack of manpower ability to conduct inspections and lack of availability of tools. Based on this, the researcher proposed that a tool procurement training be held so that excessive workload does not occur [5].

4.According to research conducted by Nurul Hudaningsih and Riki Prayoga, employee needs analysis using the FTE method can help in determining employees at packing operators. Thus, the company can minimize the shortage of employees at the packing operator [6].

5.According to research conducted by Widyalika Candra Dewi and Ahmad Kholid Al-Ghofari, workload analysis using the FTE method aims to determine the value of the employee's workload including less or excess workload. By knowing the value of the workload, companies can increase or even reduce employees. This is so that packaging operators can work properly that do not experience excessive workloads [7].

In this study, we will use the FTE Method with an analysis of the 5W+1H approach that ensures this problem is conveyed well. In addition, the purpose of this 5W+1H Analysis is to clarify the problems contained in this study. In addition, it can make it easier to solve an existing problem. And can help minimize the occurrence of these problems.

Ergonomics is a discipline structured to use all information related to human characteristics, capabilities, and limitations in designing an optimal work system to achieve the desired goals through the implementation of work that is efficient, effective, safe, and comfortable [8]. Bridger states that the focus of ergonomics involves three key elements, namely the individual, the machine, and the environment, which interact with each other. This interaction produces an inseparable framework between one element and another, known as a work system. The main purpose of ergonomics is to examine the limitations in the interaction between the human body and its work environment, both in terms of physical and mental [9] [10] [11] [12].

The work environment in a company has important significance in its management. Although not all tasks are carried out in one place, this factor has a great impact. The work environment plays a vital role in interaction with employees, with the potential to improve their performance. Conversely, an inadequate environment may hinder employee productivity [13]. In addition, the work environment also affects the level of commitment to the company, employees will be less motivated in an unsupportive environment. The existence of a good work environment will encourage employees to stay in the company. According to Mangkunegara, the work environment includes all equipment and materials encountered as well as the surrounding environment where a person works [14]. On the other hand, according to Sedarmayanti, overall, the work environment consists of two components, namely the physical and non-physical work environment. The physical work environment includes all physical elements that are present around an employee's workplace and can affect them either directly or indirectly. Some of these have a direct impact on employees, while others influence through the influence of intermediaries or the general environment. Factors such as temperature, humidity, and air circulation enter this physical work environment. According to Nahawi, the factors that affect the work environment are physical conditions and non-physical conditions. In addition, other factors that affect the work environment are air temperature, job safety, and employee relations [15] [16] [17].

According to Utomo's definition, workload refers to a group of tasks or activities that must be completed by an organizational unit or individual holding a position within a certain period of time. On the other hand, according to Vanchapo's view, workload can be interpreted as a series of processes or tasks that require quick completion by a worker within a certain time limit. If a worker is able to face and handle the assigned tasks and can adapt well, then the situation is not considered a workload. However, when workers are unable to cope, these tasks and activities become a workload. Therefore, it can be concluded that the workload is a task assigned to workers and must be completed within the specified time limit [18] [19].

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In the view of Fazlur Nur Rahman and Aiza Yudha Pratama [20], the tasks given to employees can be grouped into three situations, namely tasks that are in accordance with standards, tasks that exceed capacity (over capacity), and tasks that are below capacity (under capacity). This will have an impact on increasing employee absenteeism, decreased work quality and customer complaints [21].

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Full Time Equivalent (FTE) is a workload analysis strategy based on time factors by measuring the duration of task completion and then converted into an FTE value index. The method of calculating workload using FTE involves comparing the time required to carry out various tasks with the effective time available for work. FTE aims to make job measurement simpler by converting working hours into the number of people needed to complete a specific task [22].

2. RESEARCH METHODS

The purpose of this study is to reduce the complexity of performance measurement by changing the calculation of workload from working hours to the amount of labor needed to complete a task. In this study, an approach with the Full Time Equivalent (FTE) method and field observations was used. To understand employee activities in the field, the study began by conducting direct observations and interviews with 8 employees of the remuneration and industrial relations department of PT Pupuk Kujang Cikampek. The data obtained from the respondents was then analyzed using the Full Time Equivalent (FTE) method.

Full Time Equvalent (FTE) Method

The Full Time Equivalent (FTE) method is an approach that compares the time required to complete a task with subjective work time. FTE assessment is calculated through evaluating the workload of all team members in a given work unit over a specific period of time. This approach also estimates the total workload for one year and calculates the components of the work based on the job description. The calculation results reflect a number of activities to be carried out as well as the amount of human resources required to complete those activities [23].

Data Processing Techniques

The method used in this study to process data is Full Time Equivalent (FTE), an approach that converts employee workload measurements into time estimates. This approach allows calculating the time required by employees to complete their tasks with optimal results. The data processing steps are as Figure 1. Data Processing Techniques below:

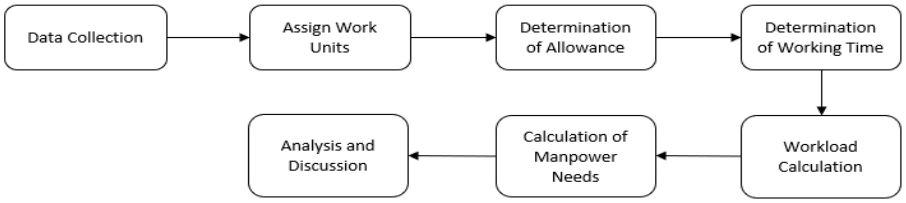

Figure 1 Data Processing Techniques

The details of the data processing technique are:

1.Data Collection

General data is collected by conducting a literature review, including reading theses, journals, and online sources. Meanwhile, special data were obtained through observation, interview interaction, and questionnaire filling by the staff involved. This approach aims to observe and understand the activities carried out by the workforce in the RHI department.

2.Assign Work Units

The working group that is the focus of the research is the Department of Remuneration and Industrial Relations (RHI) at PT Pupuk Kujang Cikampek, which consists of a total of 21 workers. However, this study chose 8 team members as the sample to be studied. This selection is made based on the number of members in each working group, where each working group is represented by 1 member as a research sample.

3.Determination of Benefits

In the real situation in the field, an employee will not be able to work regularly. Therefore, the allowance factor value is needed which is a special time for needs such as personal needs, unwinding needs, and needs beyond employee control. In this study, the value of the allowance factor was observed by the researchers themselves and approved by the company. Based on the results of direct observations in the field, an allowance value of 20% for women and 18% for men was obtained.

4.Determination of Working Time

In this step, the efficient working time will be calculated based on the provisions set out in , which refers to the [24] number of days in the calendar minus the days off and leave. After determining an efficient working day, the next step is to calculate the effective working time, that is, the amount of official working time reduced by allowances. In preparing the work schedule, the data used is the official working calendar of the Government of Indonesia for 2023. After calculation, it was found that the total effective time spent working in that year was 277 working days.

5.Workload Calculation

In this step, the workload measurement of each team member is carried out using the Full Time Equivalent (FTE) method. The results of the calculation of FTE values are divided into three categories, namely *overload*, normal, and *underload*. Based on the workload analysis guidelines released by the State Civil Service Agency through , total FTE index values exceeding 1.28 are considered overload conditions, values between 1 to 1.28 are considered under normal/ideal conditions, while FTE index values in the range of 0 to 0.99 are interpreted as underload conditions or workloads that are still lacking [23].

6.Calculation of Manpower Needs

In this step, the calculation of the number of employees needed optimally for a specific position is carried out. This approach is based on an analysis of the tasks required in the post, calculated from the total time required to complete the tasks during the year, which is then divided by the number of effective working hours in a year. This approach is the result of FTE calculations used to measure workload.

7.Analysis and Discussion

At this stage, an analysis of the results of the workload calculation for each employee in various work units in the RHI Department is carried out. The work units contained in the RHI Department include: organic labor payroll, non-organic labor payroll, programmers, employee insurance, employee welfare, employee development, administration, and staff vice president of the RHI department. The analysis continues by establishing the need for the required amount of manpower within the department.

3. RESULTS AND DISCUSSION

In this study, the first step involved collecting data. Data collection was conducted through direct observation and interviews with employees in the Department of Remuneration and Industrial Relations of PT Pupuk Kujang. The information collected includes individual details of each employee related to the tasks they perform, the duration of working hours, the frequency of work, and whether those tasks are yearly, monthly, weekly, or daily.

Table 1 illustrates the number of employees placed in the Remuneration and Industrial Relations Department, while **Table 2** displays the number of effective days used during a working year.

Table 1. Number of Manpower of Remuneration and Industrial Relations Department of PT Pupuk Kujang

Number of Manpower of Remuneration and Industrial Relations Department of PT Pupuk Kujang	
Work Unit	Number of Employees
Organic Payroll	3
Non-Organic Payroll	3
Programmer	1
Employee Insurance	2
Employee Welfare	2
Employee Coaching	2
Administration	2
RHI Vice President's Staff	1
Assistant Staff	1
Assistant *Vice President*	3
RHI Vice President	1
Total HR	21

Table 2. Number of Effective Working Days 2023

Number of Effective Working Days 2023	
Information	Number of Days
Number of days in a year	365
Number of Joint Leave Days	8
Number of Individual Leave Days	12
Number of Public Holidays	16

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Number of Sundays in a year	52
Effective Uptime	277

Labor Activity

To gain an understanding of the activities carried out by employees in the Department of Remuneration and Industrial Relations, researchers conducted direct interviews with employees from the department. The goal is to get detailed information about the activities they do on a daily basis. Details of the activities of the work units of the Remuneration and Industrial Relations Department of PT Pupuk Kujang are shown in Table **3** to **Table 10**.

Table 3. Activities of the Organic Payroll Work Unit

Activities of the Organic Payroll Work Unit						
Activities	Era	Duration (minutes)	Frequency	Number of Tbsp	Conversion in a year	Total activity time (persons/minutes)
Job Preparation today	Daily	5	1	3	277	4155
Processing the process of calculating official travel expenses	Daily	60	3	3	277	149580
Coordinating related to official accommodation	Daily	60	2	3	277	99720
Evaluation of official accommodation preparation	Daily	60	1	3	277	49860
Job evaluation today	Daily	60	1	3	277	49860
Total Activity Time of the Organic Payroll Work Unit						353175

Table 4. Activities of the Non-Organic Labor Payroll Work Unit

Activities of the Non-Organic Labor Payroll Work Unit						
Activities	Era	Duration (minutes)	Frequency	Number of Tbsp	Conversion in a year	Total activity time (persons/minutes)
Job Preparation today	Daily	5	1	3	277	4155
Bill entry to SAP	Daily	55	1	3	277	45705
Verify charges	Daily	60	3	3	277	149580
Check DOF and make papers	Daily	60	4	3	277	199440
Total Activity Time of the Non-Organic Labor Payroll Work Unit						398880

Table 5. Activities of the Programmer Work Unit

Activities of the Programmer Work Unit						
Activities	Era	Duration (minutes)	Frequency	Number of Tbsp	Conversion in a year	Total Activity Time (People/Minutes)
Job Preparation today	Daily	10	1	1	277	2770
Create completion targets in work	Daily	50	1	1	277	13850
Coding	Daily	60	6	1	277	99720
Total Activity Time of Programmer Work Unit						116340

Table 6. Activities of the Employee Insurance Work Unit

Activities of the Employee Insurance Work Unit						
Activities	Era	Duration (minutes)	Frequency	Number of Tbsp	Conversion in a year	Total activity time (persons/minutes)
Job Preparation today	Daily	10	1	2	277	5540
Creating a letter in the DOF related to insurance	Daily	50	1	2	277	27700
Employee health insurance registration	Daily	60	2	2	277	66480
Process for employee death insurance	Daily	60	1	2	277	33240
Creation of payment memos related to insurance	Daily	60	2	2	277	66480
Evaluation and discussion of today's work	Daily	60	1	2	277	33240
Total Employee Insurance Activity Time						232680

Table 7. Activities of the Employee Welfare Work Unit

Activities of the Employee Welfare Work Unit						
Activities	Era	Duration (minutes)	Frequency	Number of Tbsp	Conversion in a year	Total activity time (persons/minutes)
Job Preparation today	Daily	5	1	2	277	2770
Check the application request file that goes to the application	Daily	55	1	2	277	30470
Work on on-demand work built into the app for employee needs	Daily	60	1	2	277	33240
Make bills for medical expenses from clinics and hospitals	Daily	90	1	2	277	49860
Check the work that has been made	Daily	60	1	2	277	33240
Make a budget submission for medical expenses for employees of the board of directors of the board of commissioners in accordance with the amount of bills	Daily	90	1	2	277	49860
Ask for signatures from superiors in accordance with the files submitted	Daily	60	1	2	277	33240
Submit signed files to be submitted to the budget	Daily	60	1	2	277	33240
Total Activity Time of Work Unit Employee Welfare						265920

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Table 8. Activities of the Employee Development Work Unit

Activities of the Employee Development Work Unit						
Activities	Era	Duration (minutes)	Frequency	Number of Tbsp	Conversion in a year	Total activity time (persons/minutes)
Job Preparation today	Daily	5	1	2	277	2770
Evaluate previous work	Daily	55	1	2	277	30470
Coordinate today's tasks	Daily	60	1	2	277	33240
Carry out today's tasks	Daily	60	5	2	277	166200
Set up tomorrow's tasks and cool down	Daily	60	1	2	277	33240
Total Activity Time of the Employee Development Work Unit						265920

Table 9. Activities of RHI Vice President Staff Work Unit

Activities of RHI Vice President Staff Work Unit						
Activities	Era	Duration (minutes)	Frequency	Number of Tbsp	Conversion in a year	Total activity time (persons/minutes)
Job Preparation today	Daily	10	1	1	277	2770
Evaluation of previous work	Daily	50	1	1	277	13850
Do the day's work	Daily	60	3	1	277	49860
Conduct an audit	Daily	60	1	1	277	16620
Job evaluation today	Daily	60	1	1	277	16620
Total Activity Time of VP RHI Staff Work Unit						99720

Table 10. Activities of Administrative Work Units

Activities of Administrative Work Units						
Activities	Era	Duration (minutes)	Frequency	Number of Tbsp	Conversion in a year	Total activity time (persons/minutes)
Setting Up Today's Work	Daily	5	1	2	277	2770
Make a decision letter of the board of directors	Daily	55	1	2	277	30470
Create a board memo	Daily	60	1	2	277	33240
Mail Distribution to Other Work Units	Daily	60	1	2	277	33240
Creating SK UP Personnel	Daily	60	1	2	277	33240
Data entry inSAP stem	Daily	60	1	2	277	33240
Create SK and MD in Digital Officer (DOF)	Daily	60	1	2	277	33240
Job evaluation today	Daily	60	1	2	277	33240
Total Activity Time of Administrative Work Unit						232680

Full Time Equivalent **(FTE)** Calculation
To get the FTE value in each work unit can be done using the following rules:
1. *Allowance* = Allowance x number of days a year x minutes of work a day.
2. Total activity time = Total activity time.
3. Total time available = number of days in a year x number of hours worked in a day.

$$FTE = \frac{Total\ Activity\ Time + Allowance}{Total\ Time\ Available}$$

FTE Value Index:
<1 (*Underload*/less)
1-1.28 (Normal)
>1.28 (*Overload*)

Table 11. FTE Index Recapitulation

FTE Index Recapitulation				
Not	Work Unit	Workload	Actual Labor Numbers	Number of Labor Based on Calculations
1	Organic Payroll	2.84	3	3
2	Non-Organic Payroll	3,18	3	4
3	Programmer	1,055	1	1
4	Employee Insurance	1,95	2	2
5	Employee Welfare	2,18	2	3
6	Employee Development	2,18	2	3
7	Administration	1,93	2	2
8	RHI VP Staff	0,93	1	1

From the calculation results obtained, there are 3 work units that experience differences with the actual number of workers, namely the TKNO Payroll work unit, Employee Welfare, and Employee Development. The calculation results in the TKNO Payroll work unit worth 3.18 this means that the work *unit* needs 4 employees. While in actual conditions the number of employees amounted to 3 people. With this labor proposal, it is hoped that work in the TKNO Payroll work unit will produce effective and efficient work. Meanwhile, in the Employee Welfare *work unit*, the calculation result is 2.18. This means that the work unit requires 3 employees. In actual conditions, the work unit is filled by 2 employees. With this labor proposal, it is hoped that work in the Employee Welfare work unit will produce effective and efficient work. Similar to the Employee Development work unit, the Administration work unit obtained a score of 2.18. This means that the work unit requires 3 employees. In actual conditions, the work unit is filled by 2 employees. With this labor proposal, it is hoped that work in the Employee Development work unit will produce effective and efficient work. Furthermore, a 5W+1H analysis was carried out on the work unit in the RHI Department of PT Pupuk Kujang Cikampek. The 5W+1H analysis is listed in **Table 12. 5W+1H Analysis of RHI Department of PT Pupuk Kujang Cikampek** Below:

Table 12. 5W+1H Analysis of RHI Department of PT Pupuk Kujang Cikampek

5W+1H Analysis of RHI Department of PT Pupuk Kujang Cikampek					
What	*When*	*Where*	*Why*	*Who*	*How*
What happened?	When did it happen?	Where does it happen?	Why does it happen?	Who is experiencing?	How to minimize its occurrence?
There is a workload felt by the workforce of the RHI Department of PT Pupuk	The occurrence of the workload when the workforce carries out daily activities.	Happened to the RHI Department of PT Pupuk Kujang CIkampek.	There are excessive tasks and longer work duration in the work unit.	TKNO payroll work unit, employee welfare, and employee coaching.	Propose to increase the workforce in the work unit by one worker.

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Kujang Cikampek.

In the 5W+1H analysis of the RHI Department of PT Pupuk Kujang Cikampek, it is known that the workload experienced by several work units in the department occurs when carrying out daily activities. This happens because the tasks in some of these work units are more and the duration of work is longer than other work units. The improvement is to minimize the workload felt by the work unit, there is an additional workforce of one person in each TKNO payroll work unit, employee welfare, and employee coaching In addition to the addition of labor, it can provide rewards for workers who meet or exceed expectations and contribute significantly to the company. According to [25] the workload can be reduced by providing adequate rest, regular physical activity, rotating workers, and entertaining programs. In addition, in this study there are shortcomings, namely respondents who fill out questionnaires using samples, so it is still not strong in its evidence.

4. CONCLUTION

The workload in the work unit of the Department of Remuneration and Industrial Relations varies, including: (1) In the TKO Payroll work unit has a workload value of 2.84, this indicates that the work in the work unit has an excessive workload or overload. (2) In the TKNO Payroll work unit has a workload value of 3.18, this indicates that the work in the work unit has an excessive workload or overload. (3) The Programmer's work unit has a workload value of 1.06, this indicates that the work in the work unit has a normal workload. (4) In the work unit, Employee Insurance has a workload value of 1.95, this indicates that the work in the work unit has an excessive workload or overload. (5) In the work unit, Employee Welfare has a workload value of 2.18, this indicates that the work in the work unit has an excessive workload or overload. (6) In the work unit, Employee Development has a workload value of 2.18, this indicates that the work in the work unit has an excessive workload or overload. (7) The administrative work unit has a workload value of 1.93, this indicates that the work in the work unit has an excessive workload or overload. (8) In the RHI VP Staff work unit, it has a workload value of 0.93, this indicates that the work in the work unit has a workload that is close to normal or under looad. There are proposals to add employees to several work units, including: (1) TKNO Payroll work unit has 3 employees, the author proposes to add 1 employee, (2) The Employee Welfare work unit has 2 employees, the author proposes to add 1 employee and (3) the Employee Development work unit has 2 employees, the author proposes to add 1 employee. In addition to the addition of labor, it can provide rewards for workers who meet or exceed expectations and contribute significantly to the company.

REFERENCE

[1] B. Nugraha, Pengembangan Sumber Daya Manusia: Deskripsi Teoretis tentang Kinerja Pegawai, Penilaian Kinerja Pegawai dan Pemeliharaan SDM, Banyumas: CV. Pena Persada, 2021.

[2] A. T. Septiansyah, R. Fitriani and B. Nugraha, "Mental work load analysis melalui national aeronautics and space administration (NASA)-task load index (TLX)," *Jurnal Sains dan Teknologi : Keilmuan dan Aplikasi Teknologi Industri*, pp. 282-291, 2021.

[3] T. G. Pasaribu and A. E. Nugraha, "Identifikasi dan Analisis Beban Kerja Mental Karyawan menggunakan Metode NASA TLX di PT XYZ," *Jurnal Serambi Engineering*, vol. VIII, no. 2, pp. 5650-5658, 2023.

[4] A. Pramesti and E. Suhendar, " Analisis Beban Kerja Menggunakan Metode Nasa-Tlx Pada CV. Bahagia Jaya Alsindo," *Jurnal STRING (Satuan Tulisan Riset dan Inovasi Teknologi)*, vol. V, no. 3, pp. 229-235, 2021.

[5] Z. A. Yasmin and S. Ariyanti, "Analisis Beban Kerja Pada Maintenance Bd-Check Dengan Metode Full Time Equivalent (FTE)," *Jurnal Ilmiah Teknik Industri*, pp. 55-62, 2018.

[6] N. Hudaningsih and R. Prayoga, "Analisis Kebutuhan Karyawan Dengan Menggunakan Metode Full Time Equivalent (FTE) Pada Departemen Produksi Pt. Borsya Cipta Communica," *Jurnal TAMBORA*, pp. 98-106, 2019.

[7] W. C. Dewi and A. K. Al-Ghofari, "Analisis Beban Kerja Dengan Metode Full Time Equivalent (FTE) Untuk Menentuka Kebutuhan Operator Proses Pengemasan Kosmetik PT. XYZ," *IENACO*, pp. 96-103, 2020.

[8] N. Hudaningsih, D. Rahman, I. A. J. and Fazriansyah, "ANALISIS POSTUR KERJA PADA SAAT MENGGANTI OLI MOBIL DENGAN MENGGUNAKAN METODE RAPID UPPER LIMB ASSESSMENT (RULA) DAN RAPID ENTIRE BODY ASSESSMENT (REBA) DI BENGKEL BAROKAH MANDIRI.," *JURNAL INDUSTRI & TEKNOLOGI SAMAWA*, vol. II, no. 1, pp. 6-10, 2021.

[9] A. A. Masruri and R. Patradhiani, "Faktor Ergonomi Terkait Kenyamanan Ruang Kelas Fakultas Teknik Universitas Muhammadiyah Palembang," *Integrasi : Jurnal Ilmiah Teknik Industri,* vol. IV, no. 1, pp. 40-48, 2019.

[10] R. Ginting, Perancangan Produk, Yogyakarta: Graha Ilmu, 2010.

[11] R. Bridger, Introduction to Ergonomics, London : Taylor & Francis e-Library, 2003.

[12] Tarwaka, L. Sudiajeng, S. H.A and Bakri., Ergonomi Untuk Kesehatan dan Keselamatan Kerja dan Produktivitas., Surakarta: UNIBA Press, 2004.

[13] L. Juliani, A. Djauhar and H. H. Titop, "PENGARUH LINGKUNGAN KERJA TERHADAP KINERJA KARYAWAN PADA PT MATAHARI DEPARTMENT STORE Tbk BRILYAN PLAZA KENDARI," *Sultra Journal of Economic and Business,* vol. IV, no. 1, pp. 72-85, 2023.

[14] A. J. Ahmad, M. Mappamiring and N. Mustari, "Pengaruh Lingkungan Kerja Terhadap Kinerja Pegawai Di Dinas Pendidikan Dan Kebudayaan Kabupaten Bulukumba," *Kajian Ilmiah Mahasiswa Admnistrasi Publik*, vol. III, no. 1, pp. 287-298, 2022.

[15] A. P. Mangkunegara, Manajemen Sumber Daya Manusia Perusahaan, Bandung: Rosda, 2017.

[16] Sedarmayanti, Sumber Daya Manusia dan Produktivitas Kerja, Bandung : CV. Mandar Maju, 2009.

[17] H. Nahawi, Manajemen Sumber Daya Manusia Untuk Bisnis Yang Kompetitif, Cetakan ke-7, Yogyakarta: Gadjah Mada University Press, 2003.

[18] T. Utomo, Analisis Beban Kerja dalam Rangka Analisis Kebutuhan, Yogyakarta: Universitas Gadjah Mada, 2008.

[19] A. Vanchapo, Beban Kerja Dan Stres Kerja, edisi pertama, Pasuruan, Jawa Timur: CV. Penerbit Qiara media, 2020.

[20] F. N. Rahman and A. Y. Pratama, "Analisis Beban Kerja Mental Pekerja Train Distribution PT. Solusi Bangun Indonesia," *Jurnal Teknologi dan Manajemen Industri Terapan (JTMIT),* vol. I, no. 1, pp. 7-14, 2022.

[21] R. D. Parashakti and Putriawati, "Pengaruh Keselamatan dan Kesehatan Kerja (K3), Lingkungan Kerja dan Beban Kerja Terhadap Kinerja Karyawan," *JIMT(Jurnal Ilmu Manajemen Terapan),* vol. I, no. 3, pp. 290-304, 2020.

[22] M. H. Wibisono and D. Herwanto, "Analisis Beban Kerja pada Karyawan Divisi Produksi PT. Empat Perdana Carton dengan Metode Full Time Equivalent," *Jurnal Serambi Engineering,* vol. VIII, no. 2, pp. 5135-5141, 2023.

[23] M. N. Muchlisin, "Work Load Analysis dengan Full Time Equivalent Sebagai Pertimbangan Pembagian Beban Kerja Karyawan," *Psyche 165 Journal*, vol. XIV, no. 2, pp. 233-238, 2021.

[24] K. K. R. Indonesia, "Jam Kerja Menurut Undang-Undang No 13 Tahun 2003 Tentang Ketenagakerjaan". Indonesia Patent No 13 Tahun 2003, Maret 2003.

[25] F. Mahesta, A. E. Nugraha and B. Nugraha, "Analisis Perbandingan Beban Kerja Mental Karyawan Organik dan Non Organik Menggunakan Metode Nasa TLX dan Diagram Fishbone di PT XYZ," *Angkasa Jurnal ilmiah Bidang Teknologi*, vol. 15, no. 2, pp. 225-232, 2023.

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